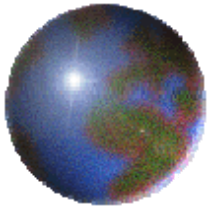


# *2005 FAA National Software Conference*

*July 26-28 – Norfolk, Virginia*

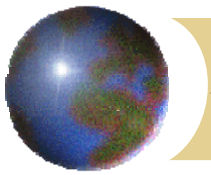


## *DO-178C*

*Jim Krodel*

*Pratt & Whitney Aircraft*





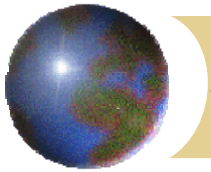
# *Participants*

## ● SC-205, RTCA, Inc.

- Jim Krodel, Pratt & Whitney – Chair
- Mike DeWalt, Certification Services, Inc. – Secretary
- Barbara Lingberg, FAA – Federal Representative
- Rudy Ruana, RTCA - Liaison

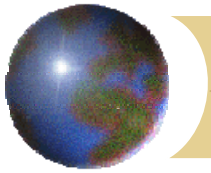
## ● WG-71, EUROCAE

- Gerard Ladier, Airbus – Chair
- Ross Hannan, Sigma Associates - Secretary



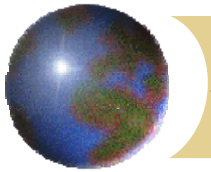
# *Committee Details*

- Joint International Committee
  - ▣ Attending - US, UK, Canada, France, Germany, Netherlands, Sweden, Australia
  - ▣ Other Members - Italy, Brazil, Russia
- Required Reading ([www.rtca.org](http://www.rtca.org))
  - ▣ DO-178B/ED-12B
  - ▣ DO-248B/ED-94B
  - ▣ DO-278/ED-109
- What this Committee is NOT
  - ▣ Not an opportunity for Commercial Venture



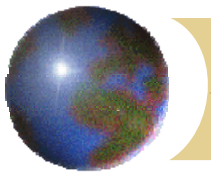
# *What is RTCA?*

- RTCA, Inc.
  - ▣ Private, not-for-profit
  - ▣ Develops consensus-based recommendations
  - ▣ Guided by the Federal Advisory Committee Act
- Federal Advisory Committee
  - ▣ Recommendations Can be Used by FAA as basis for policy and regulatory decisions
- Program Management Committee
  - ▣ Requests for technical guidance documents
  - ▣ Initiate Special Committees
    - SC205



# ***Federal Advisory Committee Act***

- **Authorized by statute by President of United States**
- **Only advisory**
- **30 day notification of SC205 meetings in the federal registry**
- **Federal Representative must be available and designated during the meeting.**
  - Barbara Lingberg
- **Open to public**
- **Minutes available for public inspection**

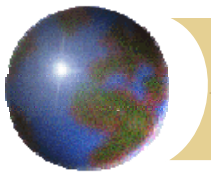


# *SC-205 / WG-71 (SCWG)*

## *Background*

### ● Outline

- History
- Related Committees
- Related Document Activities
- Software Ad Hoc Committee
- Formation of SC-205 / WG-71

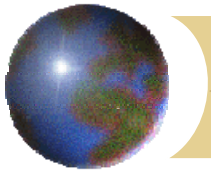


# DO-178/ED12 History



## ● Timeline History

- Nov. 1981- DO-178/ED-12-SC145
- Mar. 1985- DO-178A/ED-12A -SC152 (4 years)
  - Software Levels 1,2,3 - Crit, Essential, NonEss
  - Software Develop Steps D1-D5
  - Software Verification Steps V1-V7
- Dec. 1992- DO-178B/ED-12B -SC167 (7 years)
  - Objectives Based Tables
    - What, not how
  - Criticality Categories (A,B,C,D,E) / Objectives Matrix
- (12 years) Since DO-178B →(15 years)



# *Related Committees*

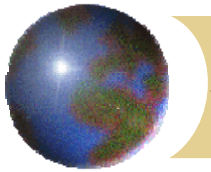
## ● Related Committees

### ■ SC190 / WG-52 (1997- 2002)

- DO-248B - Oct 2001
  - DO-178B Clarification
- DO-278 - Mar 2002
  - CNS/ATM Guidance

### ■ SC200 / WG-60 (Current)

- DO-TBD - Planned for 2005
  - Integrated Modular Avionics Considerations

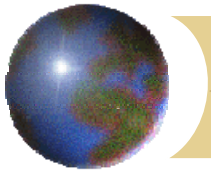


# *Other Documents*

## ● Other Active Documents

### ■ Updating

- ARP 4754 (SAE Committee S18)
  - Certification Considerations for Highly Integrated or Complex Aircraft Systems
- ARP 4761 (SAE Committee S18)
  - Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment



# *Specific Issue Identification*

- Formation of Issue List

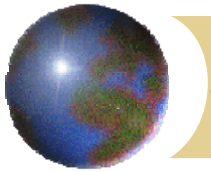
- SC190 Issue List
- FAA DER Conferences
- Software Tools Forum
- CAST Concept Papers
- FAA Sponsored Research Papers
- ... and other sources

- Resulted in 44 Issues, 24 Clarifications

- Discussed with RTCA

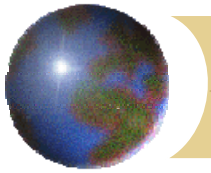
- RTCA Invitation of Ad Hoc Issue Study

- 42 Additional Issues From Invitees



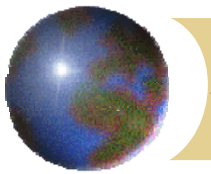
# *Ad Hoc Committee*

- Ad Hoc Committee Meeting
  - Sept 2004 - 2.5 Day Evaluation Meeting
  - Aviation Community Experts
    - Large Commercial Transport
    - General Aviation
    - Engines/Props
    - Equipment Suppliers
    - Regulatory Authorities
    - European Invitation
  - Product
    - Recommendation as to the state of the industry



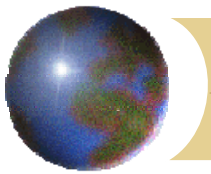
# *Sample of Issues*

- Technology Items Under Consideration
  - ❏ Automatic Code Generators
  - ❏ Model Based Design
  - ❏ Object Oriented Design
  - ❏ Application of Software Tools
  - ❏ Commercial Off the Shelf Software and Tools
  - ❏ Sophisticated Real Time Operating Systems
  - ❏ ... and others....



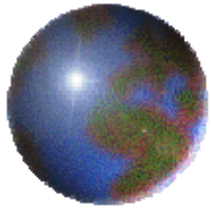
# *Steps to Formation of SC-205/WG-71*

1. Draft Terms of Reference (TORs) by SW Ad Hoc Committee [04-Sep]
2. RTCA PMC Refinement of TORs
3. EUROCAE / RTCA Acceptance of TORs[04-Dec to 05-Jan]
4. Joint SC-205 / WG-71 Formed [05-Jan]

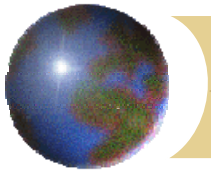


# *Level 1 Schedule*

	<b>Committee Product</b>	<b>Status</b>	<b>Date</b>
1	Detailed/refined work plan.	D	31-Mar-05
2	Identification and analysis of issues to be addressed by the committee.	M	31-Jul-05
3	Definition of committee structure and allocation of issues.	M	1-Oct-05
4	Guidelines and template for committee products.	M	1-Oct-05
5	Draft guidance and guideline material for plenary discussion.	M	September 1, 2006 thru October 1, 2007
6	Final committee meeting	M	1-Oct-08
7	Delivery of the following products to RTCA/EUROCAE: DO-178C/ED-12C [Guidance], DO-248C/ED94C [Guidelines], Supplements A through n. Packaging to be confirmed as part of item 1.	D	1-Dec-08

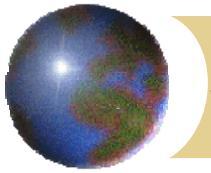


# *Review of SCWG Operations*



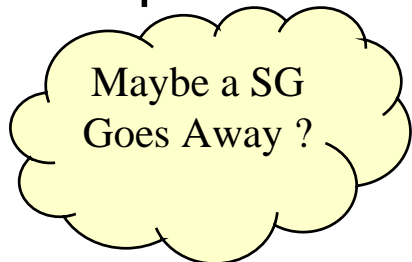
# *Organization*

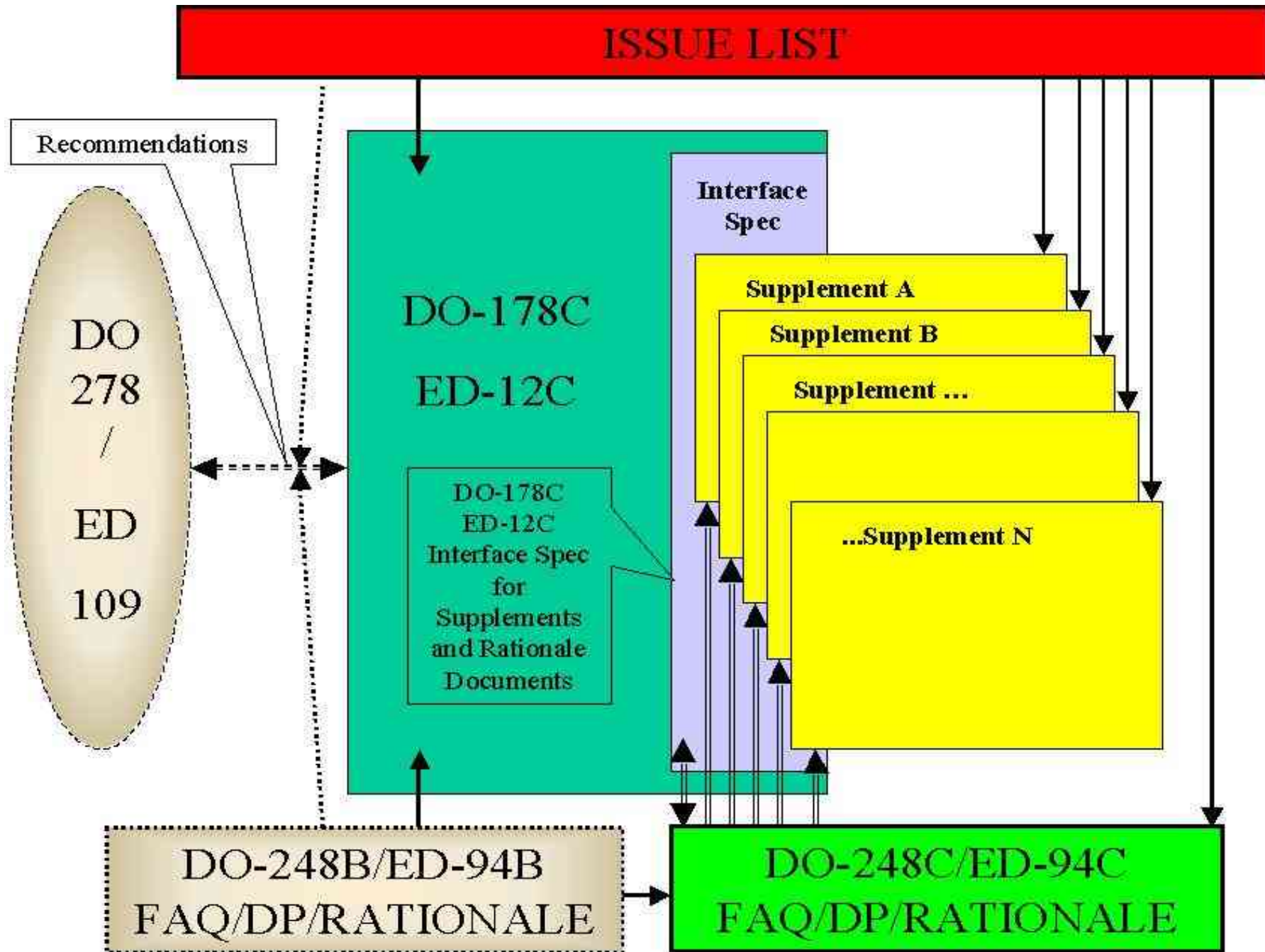
- Plenary Meeting 2X per year
  - ▣ Development and Coordination of Products
- Parallel Working Sub-Groups
  - ▣ Meet During Plenary toward Deliverables
  - ▣ Inter-plenary Meetings/Sessions
    - Sub-Group Meeting Norms
  - ▣ Joint RTCA / EUROCAE Sub-Group Chairs
  - ▣ Secretaries Optional

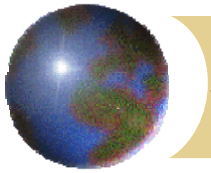


# *Identified Sub-Groups*

- SG1: SCWG Document Integration Sub-group
- SG2: Issues & Rationale Sub-group
- SG3: Tool Qualification Sub-group
- SG4: Model Based Design & Verification Sub-group
- SG5: Object Oriented Technology Sub-group
- SG6: Formal Methods Sub-group
- SG7: Special Considerations Sub-group

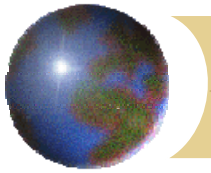






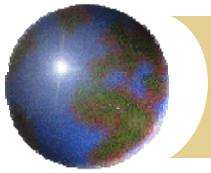
# *Product List*

- Issue List
- DO-178C/ED-12C
- DO-248C/ED/94C
- DO-178C/ED-12C Interface Specification
- Supplement A (topic A)
- Supplement B (topic B)
- Supplement C (topic C)
- Supplement n (topic n)
- DO-278/ED-109 Recommendations



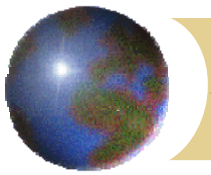
## *Web-site*

- <http://ultra.pr.erau.edu/SCAS/>
- Host - Embry Riddle Aeronautical University
  - Prescott Arizona, USA
  - Web forum liaison/administrator
    - (Professor Matt Jaffe).
  - Each sub-group has an area for
    - Submitting documents
    - Reviewing documents
    - Submitting comments to those documents
    - Other communications between the members of our committee (SCAS – Software Considerations in Aeronautical Software).



## *Web-Site (cont.)*

- The primary vehicle for disseminating information to the committee members.
- To obtain a login ID
  - Self-register at the following URL.
    - [http://ultra.pr.erau.edu/SCAS/dispatch.cgi/\\_user/register](http://ultra.pr.erau.edu/SCAS/dispatch.cgi/_user/register)
- Or contact the following.
  - US Committee Secretary Mike DeWalt:  
Mike.DeWalt@certification.com
  - EUROCAE Committee Secretary Ross Hannan:  
ross\_hannan@btinternet.com



# *Hardware & Software Recommendations*

- Hardware – Laptop / Desktop
  - ❏ CD-ROM capable
  - ❏ USB Memory Stick capable
  - ❏ Web capable
  - ❏ Email capable
  - ❏ Wireless Internet for laptops is recommended.